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nations of external modifying stimuli and nutritive conditions, in the widest sense, is exceeded. In each ever-sporting variety there is a critical period at which the "normal" or the "sport" condition is determined. If this period occurs late in the ontogeny, the sport appears as a partial variation, as in the five-leafed clovers; and if it is very early in the ontogeny, the variation appears to be individual, as in the case of double stocks.

A sharp distinction is drawn between these modifications and mutations, and KLEBS is criticized for failing to keep them separate. This criticism would apply equally well to many other writers.

With ever-sporting varieties, many variegate-leaved varieties have a great but purely superficial resemblance. The author recognizes two types of golden modification, one due to disease, the other hereditary. Pedigree cultures with the latter type present striking results in the case of *Antirrhinum majus pumilum fol. aureis* and *Pelargonium zonale.* In Antirrhinum the cross between any two variegated specimens gives variegated and green in ratio 2:1, of which the green breed true. The conclusion was reached that variegation is in this case a Mendelian character, in which the union of two "variegated" gametes does not give rise to a successful zygote. In proof of this view, the cross between variegated and green (DR×R) gave in every case the expected ratio 1:1. Every variegated individual is thus a heterozygote, and the problem of the "fixation" of the variegated race is the same as that of the fixation of the blue Andalusian race of fowls.

In *Pelargonium zonale* a somewhat similar situation seems to exist, but here the extracted dominants, instead of being entirely incapable of development, appear as pure-white individuals which perish very early, leaving again the ratio of variegated to green, 2DR:1R.—GEO. H. SHULL.

Injury by smoke.—Continuing the studies embodied in the volume published a few years ago on the injury of vegetation by smoke,[15] which treated chiefly of gases, HASELHOFF, with the assistance of several colleagues, has been investigating the effect of the solid constituents of smoke and other factory emanations, which fall as dust, and may injure plants either directly by contact with their leaves or indirectly through their roots by way of the soil.[16] Such investigations are particularly important in continental countries, where huge factories are often closely surrounded by cultivated fields. They are of less value in this country, where the cultivation is less close and a strong tendency exists to mass factories in industrial centers. Yet at any time such data as are here set forth may be called for as a guide for legislation, or in civil cases.

HASELHOFF finds that the dust varies much in composition even from similar fuels and the same sort of factories, so that it becomes necessary in each case to determine its composition. Chlorids (NaCl), sulfids ($NaSO_2$ and $Ca(SO_2)_2$), and perhaps also sulfates ($NaSO_4$) are particularly injurious. The sulfids are injurious through their action upon the soil, especially if its unfavorable condition facilitates the formation of H_2S. Analysis of plants often shows them to contain an increased quantity of the constituents of the dust. Microscopic investigation of the leaves shows clearly the injurious action of various dusts, which is substantiated by tests with the component salts; but there are no typical anatomical marks by which the injury wrought by one kind of dust may be distinguished from another.—C. R. B.

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[15] See BOT. GAZETTE **38**:148. 1904.

[16] HASELHOFF, E., Versuche über die Einwirkung von Flugstaub auf Boden und Pflanzen. Landw. Versuchs-Stat. **67**:157–205. *pls. 1, 2.* 1907.

Polystelic roots.—Polystely in stems, as described by VAN TIEGHEM, has been disproved, but it seems clear that the phenomenon occurs in roots. CORMACK and later DRABBLE[17] described a multistelic condition in the roots of palms, and a recent research by WHITE[18] proves its occurrence in both the lateral and the tuberous roots of certain orchids belonging to Ophrydinae. In *Habenaria orbiculata* the stele of the lateral root is at its base monostelic, farther out it flattens, becomes horseshoe-shaped, then divides into two steles which at the tip merge into a common plerome cyclinder. In *H. blephariglottis* a protostele acquires a pith and internal endodermis, then opens out to a horseshoe-shape from the free ends of which steles are constricted; as in the former case these steles merge into a common plerome at the root tip. In *H. hyberborea* the steles are separate from the start, but increase in number as they proceed farther from their origin. In the tubers the steles have a similar diffuse origin, and it was upon a study of these that VAN TIEGHEM founded his theory of "concrescence" to account for the conditions seen in orchid roots. The present research strongly supports the view advanced by JEFFREY as to the extrastelar nature of the pith, for in *H. blephariglottis* the pith of the proximal part of the central cylinder merges into the fundamental tissue of the polystele. Moreover, the plerome initials are seen to give rise to both fundamental and vascular tissues, hence HANSTEIN'S theory as to the correspondence of plerome and periblem to stele and cortex respectively cannot be maintained.—M. A. CHRYSLER.

Salt marshes of New England.—The construction of an electric railroad across a salt marsh at York, Maine, recently afforded an opportunity of examining a vertical section through the deposits beneath the turf of the marsh. A study of such a section by PENHALLOW[19] shows that there was an abrupt conversion of a fresh-water bog into a salt marsh by the sudden intrusion of sea water, and that this phenomenon was connected with the gradual subsidence of the general area in which the marsh is situated. It would appear that at some former time (Pliocene) shallow basins existed between islands along the Atlantic coast, and some of these basins, being cut off by the formation of barrier reefs, were converted into

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[17] Reviewed in this journal **39**:382. 1905.

[18] WHITE, J. H., On polystely in roots of Orchidaceae. Univ. of Toronto Studies, Biological Series no. 6. pp. 20. *pls. 1, 2.* 1907.

[19] PENHALLOW, D. P., A contribution to our knowledge of the origin and development of certain marsh lands on the coast of New England. Trans. Roy. Soc. Canada III. 14:13–56. 1907.